June 1985

D. Selly

Timex Sinclair User Group NEWSLETTER

EDITOR - R. MULDER
DESIGNER - J. TURNER

OTTAWA CHAPTER
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Table of Contents

Meetings

President's Address

Letters to the Editor

General

Forth Corner

Software Review

Personal

Meetings

LOCATION: All meetings are held at the NRC bldg. 100 Sussex Dr. Room 1129B. Check in with security.
TIME: Meetings are held at 8:00 p.m. on the last Thursday of each month unless otherwise posted.
FORMAT: Each meeting will take the following format:
---President's address and intro of new members.
---Software Review (maximum 20 min.)
---Hardware Review (maximum 20 min.)
---Adjournment of formal part of meeting.
---Informal: members dicuss common problems, swap programs etc.....

From the PRESIDENT

Who said the living was easy in summer time? He mustn't have been married or owned a house that's all I've got to say. The net result is that I haven't a lot to say of consequence this month (so what's new). Perhaps a little gossip might be of interest.

For those who haven't heard, TIMEX is back in the computer business in Portugal. They have been marketing a modified version of the 2068 (or the Spectrum depending on your point of view) in Europe and have been making overtures to do likewise in the United States. The computer looks like a TS2068 and will run 2068 software, or Spectrum software if you plug an emulator into the cartridge port. The rear connector matches the Spectrum computer rather than the TS 2068. A 3-inch Floppy Disc system is also available. I understand the price for the computer,the disc interface, one disk drive and all connectors is $400 US. Notwithstanding the price, I am of the opinion that consumer demand for home computers has run it's course and we will no longer see the demand of previous years.

SYNTAX is definitely going down the tubes. They will publish enough new issues to complete all current subscriptions but after that, zippo. For what it's worth, the last issue I received was November 1984.

According to the Globe and Mail, Sir Clive Sinclair is giving up control of his ailing home computer company to publisher Robert Maxwell. Sinclair had low sales during the Christmas

season when the huge demand of previous years failed to repeat. r. Maxwell will own 75% of the company.
On another matter, hats off to Vic Shideler for organizing the keyboard love-in. I understand seven keyboards were wired up on Mrs. Schidler's dining room table and now Vic has been grounded (not the same way Jim Turner does it) for life. Everybody had a great time pulling wires and blowing fuses.

I bought myself a John Oliger expansion board for my 2068. It will handle four cards. It includes an RGB interface which works great. A little later on I'll be buying a Centronics Interface card for a printer and maybe a Disc Drive Interface card. I also bought an EPROM blower from the same supplier but haven't wired it up yet.

I have a disk drive system form LARKIN Electronics (Larry Kenny) that I'm evaluating and I'll put my report in the next issue of the newsletter.

Thanks to Roelof Mulder for chairing the June meeting in my absence.

LETTERS TO THE EDITOR

(again in this case-from)

There comes a time when the people who contribute regularily to any given endevour, such as a newsletter, either run out of things to put into the newsletter or run out of initiative and question the reason to continue. Either other people start participating or the regulars will quit. Now, for the most part, being community or social minded, the regulars will most likely scrape the bottom of the barrel or dig and research for more material just to continue the information flow. That is the nature of the beast. But where has the rest of the world gone?????

THE EDITOR

LIBRARY CORNER (as at May 30)

Since the time that I last reported to the newsletter, the library has aquired many additions to its holdings. While this is pleasing to see, it now means that I am unable to bring the complete library inventory with me to each meeting although I shall continue to bring the catalogue and indices.
If anyone wishes to reserve a particular program or would like more information, please call 731-2120. The last day for reservations is the Tuesday prior to each meeting.
I would like to thank all those people who have contributed and urge all the other members to do the same if at all possible.

David Solly,

Librarian

GENERAL

NEWS FROM OUR ROVING REPORTER - L.Foss

Yours truly has set up a Bulletin board system for the Timex/Sinclair users who have a modem. The BBS is not restricted to TS users, but you will find a message area and a files area dedicated to the TS user. The system is up and running and is free of charge. It operates in the hours of 17:00 - 7:00 on workdays, and all day on weekends and holidays. The telephone number is 997-1967 (area codes either 819 or 613).
Sinclair is rumoured to be working on a scaled down version of the QL, possibly linked to a flat TV screen and portable. Sinclair has already ceased production of the Spectrum and replaced it with the Spectrum+.
Meanwhile,the ZX81 is still in production . Mark L. Fendrick , on the Zebra BBS, reports a new interface board for the 2068. Called the Z-LINK, it emulates the Spectrum Interface 1 on the TS2068, which then lets you use Spectrum peripherals from Britain, such as microdrives.

He also reports that the Damco Company has bought the ROTRONICS Wafadrive and added an emulation device and it works in the TS2068 mode (but not the Spectrum mode). While on the subject of the Wafadrive there is a report of a bug that does not allow the Wafadrive to save byte # 65535.

There is also an interesting "bug" in the Spectrum and TS2068 logic. "Cursor down" is represented by CHR$(26), and "Cursor up" is CHR$(24), so you would expect PRINT "ABC"+CHR$(26)+CHR$(24)+CHR$(24)+"DEF" would give us:

```
"ABC
                          DEF"
```

However, on the Spectrum we get "DEF", because the backspace can be PRINT'ed, but the CURSOR DOWN character cannot. The TS2068, on the other hand gives us "ABC???DEF",ie. neither character can be print'ed.

SOFTWARE FARMS, the authors of the remarkable FORTYNINER and ROCKETMAN for the ZX81 have announced a new product for the ZX81. The "SPECTRUMIZER" purports to enable the ZX81 to produce graphics of the same quality and standards as those on the Spectrum. "It also has the ability to convert Basic to machine code." A compiler?

For those interested, we have a TS Users Group in Toronto:
c/o George Chambers (Pres.)
P.O. BOX 7274 STN "A"
TORONTO, ONT.
M3W 1X9

Dues are $20 per annum, which provides a subscription to their Newsletter.

That's all for now from your travelling reporter (now vacationing in sunny Greece).

L.FOSS

STRUCTURED PROGRAMMING CORE PROGRAM FRAMEWORK

This article and concept is submitted by Iris tenHolder and follows the principles of the structured programming concepts as outlined in numerous articles on the same subject.

ADVANTAGES

-similar structure for all programs
-a listing of the first 22 program lines shows the layout of the main components of the program
-blocks can be located in a predetermined number range
-blocks always start at an even hundreds position
-rem statements are only required to indicate subroutines
-most other program indicators can be incorporated in print statements
-no danger of having to renumber
-program framework can be saved and used as a starter program incorporating a saving routine and other standard routines

STRUCTURE

0-99 program outline with gosub statements
100-999 main program
1000-menu
2000-subroutines

A framework for a program could look like this:

```
1 GOSUB MENU
10 SET UP DIM STATEMENTS
15 GOSUB 100 (OR 1100)
20 FILL ARRAYS
25 GOSUB 200 (OR 2100)
30 INPUT DATA
35 GOSUB 300
40 CALCULATIONS
45 GOSUB 400
50 LPRINT
55 GOSUB 500
60 OTHER
65 GOSUB 600
70 OTHER
75 GOSUB 700
80 SAVE
85 GOSUB 800
90 END
99 STOP
199 RETURN
299 RETURN
399 RETURN
499 RETURN
599 RETURN
699 RETURN
799 RETURN
899 RETURN
```

THIS PROGRAM , AS YOU CAN SEE IS HIGHLY STRUCTURED AND CAN BE USED AS IS.
THE NEXT INSTALLMENT WILL OUTLINE A MENU.

A SINCLAIR QUICKFIX

One of the ZX81 (TS1000)'s main faults is it's inability to make data tapes. Until now, whenever the Zx81 wrote to tape, it would always transfer both the Basic program and whatever variables had been defined.
The following two short M/C programs will allow you to read or write data only, to tape, without affecting the Basic program. The programs are hidden in the first line of a Basic as a REM statement and called from within the Basic program by a USR command. The programs will transfer an array of numbers or strings to or from tape. The array can have any name, size and any number of dimensions. There are of course some setting up and restrictions to follow. First of all, the programs will only transfer arrays. Second, the array to be filled by the Read program must be the same size as that written to tape. Third, the REM statement holding the M/C programs must be the first line in the Basic program. And finally, the DIM command to set up the array must be the first command executed (except for REM commands). Also, because it's impossible for two arrays to be on the stack at the same time, only one array can be written or read from tape from a given Basic program.
The following listings should be put into the Zx81 in the order that they appear. Follow the prompts.

LISTING 1

This is the basic program that will load in the M/C hex code that follows. (rem has 90 #'s)

```
10 REM 123456789012345678901234
       567890123456789012345678
       901234567890123456789012
       345678901234567890123 4
100 LET S$="0123456789ABCDEF"
110 FOR X=16514 TO 16603
120 INPUT H$
130 LET D=0
140 FOR Y=0 TO 1
150 FOR Z=0 TO 15
160 IF H$(Y+1)<>S$(Z+1) THEN
GOTO 180
170 LET D=+Z*16**(1-Y)
180 NEXT Z
190 NEXT Y
200 POKE X,D
210 PRINT H$;"    ";
220 NEXT X
```

LISTING 2

Run program in listing 1 and enter the following hex codes 2 at a time ie, ED , CD , ETC... key in the ENTER key after each input.

```
CD E7 02 06 0E 21 00 FF 2B 7C
B5 20 FB 10 F6 2A 10 40 23 4E
23 46 23 C5 5E CD 1F 03 C1 0B
78 B1 20 F4 C9
CD E7 02 2A 10 40 23 4E 23 46
23 C5 1E 08 DB FE D3 FF 17 30
F9 0E 94 06 1A 0D DB FE 17 CB
79 79 38 F5 10 F5 20 04 FE 56
30 E4 3F CB 16 1D 20 DE C1 0B
78 B1 C8 18 D3
```

Now go back and check that you have entered in the code correctly. Line 10 of your program should now contain all sorts of strange words and symbols. Ensure that line 100 remains intact. If line 100 is OK then delete all except for line 10. (save to tape now!)

The following two listings demonstrate the use of the Read and Write M/C programs.

LISTING 3

```
10 REM  (OF ORIGINAL IN LIST 1)
20 DIM A(200)
30 FOR X=1 TO 200
40 LET A(X)=X
50 NEXT X
60 PRINT "START TAPE"
70 INPUT D$
80 LET X=USR 16514
```

LISTING 4

```
10 REM  (OF ORIGINAL IN LIST 1)
20 DIM B(200)
30 PRINT "START TAPE"
40 INPUT D$
50 LET X=USR 16549
60 SLOW
70 FOR X=1 TO 200
80 PRINT B(X),
90 NEXT X
```

One last note, the M/C programs read and write to tape the same way that tha Zx81 reads and writes Basic programs so the same volume settings should work with these programs.

(EXTRACT-MICROCOMPUTING MAY/83)

PROGRAM HINTS POKES-2068

```
ATIC ATAC-INFINATE LIVES
          POKE 36519,0
          STOP ENERGY DRAIN
          POKE 35353,0
SABRE WULF-REMOVE MONSTERS
          POKE 39702,30
HOBBIT-WEAR RING TWICE IN EACH
       LOCATION AND IN FOREST
      -DON'T ANSWER GOLLUM'S
       RIDDLES
      -EXAMINE MAGIC DOOR IN
       GREAT HALLS THEN OPEN
      -IN GOLLUM'S DUNGEON ASK
       THORIN TO OPEN WINDOW
       PICK YOU UP THEN GO
```

HARDWARE

ITEM: Millennia K Disc
Drive Interface
AVAILABLE: Ramex International
Limited
48945 Van Dyke Rd.,
Utica, Michigan
48087 U.S.A.
PRICE: interface only-$200.00
complete unit with
interface, drive,power,
and cables--$450.00 U.S.
For use with 2068 only!

ADVERTIZED DETAILS:
- SP-DOS operating system
- loads 32K in 1 second
- stores 800K on 1 disc
- occupies 4K ram (mini-dos)
  7.6 K main dos
- software support--
  - Tasword,Tasmerge,Devpac,
    Masterfile, OmnicalcII
- language support--
  - Disc Pascal, "C" compiler
- first disc drive must be
  "QUAD"-96 TPI
- discs 2 to 4 can be any other
  Shuggard standard

GENERAL

I was sent the advert for the Ramex Millennia K drive by my friend in the States and I decided to take the plunge. I ordered the full system $450.00 with my Visa in mid-June. Four weeks later I decided to give Ramex a call to check on the progress of my order. To my dismay, they informed me that Visa would not accept the charges. But neither did Ramex give me a call to inform me of this fact. I still wanted the Disc drive system, so I obtained the appropriate money orders and sent them off on May 8,1985. The Unit arrived May 31,1985.

It cost me an additional $74. Canadian to get the package out of Customs. Cost todate for the unit-$710.CDN. The packaging was excellent. And at 10 lbs it should be. The contents were: 1 interface (uncased), 1 cable, 1 disc drive and power supply fully encased, 1 Millennia K operators manual, and 1 systems disc.

I opened up the disc drive casing to plug in the interface cable and had to wonder which way to plug it in. Of course there were no instructions for this minor thing. I took a chance, plugged it in and closed the casing. In order to make a valid test of the system and to ensure that none of my peripherals would interfere, I disconnected everything else, and plugged in the interface.

The moment of truth! I placed in the systems disc into the drive, switched on the computer and then the power supply from the drive. NOTHING HAPPENED! Dismay---but wait, how silly of me. I have a Romswitch and the setting was of course on Spectrum. I swiched to 2068 and repeated the procedure.

Up came the 2 line copyright from Sinclair, then the drive started up and presto, the copyright of SP-DOS. It works so far. Everything that you do to be directed to the drive system is fronted by: PRINT#4:. The usual load,save,cat, etc follows. So I try the "CAT" function and up comes the catalogue. So far so good.

The obvious step next would be to format a new disc and save a program to it. A box of 10 discs cost me a further $73. But I should now have an incredible 8 million K of disc storage!

The following point form for the major funtions (all of which appear on the 2068 keyboard) are my current findings:

COMMAND	FINDINGS
FORMAT	-unfortunately does not work, but it may be a faulty disc controller chip on the interface
COPYSYS	-this copies the SPDOS system onto a new disc format is part of its function and in this case it worked.
CAT	-catalogue or directory
SAVE	-same as Basic and you can auto-run programs

LOAD -same as Basic (data,screen,code, etc..)

ERASE -erase a file or program from dir.

MERGE -same as Basic But auto-run programs will not be stopped.

MOVE -used to change file names or disc and to transfer programs from one disc to another

There are many more instructions and variations and they all work the same as any top of the line computer such as IBM, only in my unbiased opinion-BETTER!

Note: 2 dos systems available that reside in different places so that you can get around some of the program loading and saving problems.

FINAL ANALYSIS

COST: may be too high for most 2068 owners
if retention/manipulation of massive data bases is important then this may still be cost effective

HARDWARE QUALITY:
As the interface casing has not yet arrived- no comment
The interface itself is of high quality with all socketed chips and no jumper wires
The drive and power supply are excellent quality and function smoothly,cooly,if a bit noisely.
overall***EXCELLENT****

OPERATORS MANUAL:
Professional layout and presentation gets you up and running, but a lesson in user friendly could be of some help.
some program examples and the SPDOS disassembly would be of great benefit to serious programmers

DEALER SUPPORT:
Membership available for dos system from Britain-$16 onetime fee + $22 for one year.
I wrote to Ramex about the casing,format problem and the possibilities of a Spectrum "fix", but I have not received an answer as yet. Patience!

OVERALL ASSESSMENT:
As a novice in the hardware field as well as a budding programmer and Editor of the TSUG OTTAWA Newsletter and other articles for other "rags", I can only offer my novice opinion.

In this case, I am giving the system my full support! Cost not withstanding, the unit works as advertized if not better, and the quality of the product is excellent. As soon as I get my answers from Ramex I will convey these to you as well.

Excellent system!
R.Mulder Editor

4th CORNER

Well here I am again and guess what? You're right, no input again! Forth must have died. Well for posterity sake, up and at them!

Ok, error correction first. if you had put in the first screen as is, compiled it and tried to load the two arrays COMPUTER and PLAYER and then tried a COMPARE, you should have gotten an error code stating that the word COMPARE had not been defined.

That's odd you say, after compiling you did a VLIST and COMPARE was in the dictionary. But did you do a VLIST after you had loaded the 2 arrays? Try it!

What you should find is that COMPARE has disappeared. The defining word ARRAY takes a number from the stack and allots memory spaces the same as the Basic statement DIM does. The only difference is that ARRAY uses 2 bytes per number and therefore requires twice the the size actually needed.

The reason that the COMPARE word disappeared is that when you loaded the first two arrays, you overwrote the third, namely, COMPARE.

Now go back to screen #1 and replace all the 4's for the arrays to 8's. And while you are at it change the following lines to read:

```
6 : INPUT.COM 5 1 DO I 7 RND
  SWAP COMPUTER ! LOOP ;
14 : INPUT.PLAY 5 1 DO ECHECK I
  PLAYER ! LOOP 1 TRIES +! ;
```

```
SCR#2

0 ( SCR#2 OF FORTHMIND )
  0 VARIABLE WRONG.MATCH
1 : ONE/CK 5 1 DO COMPARE @ 1 =
IF INDIV.MATCH +1 ENDIF LOOP ;
2 : ALL/CK INDIV.MATCH @
  WRONG.MATCH @ + ANYMATCH ! ;
3 : WRONG/CK 5 1 DO I COMPARE @
  0= IF 5 1 DO J DUP PLAYER @
4 SWAP COMPUTER @ = IF
  WRONG.MATCH +! ENDIF LOOP
5 ENDIF LOOP ;
6
7
8     Sorry that's all for
9     now! Publishing time
10    prevents continuing
11    this screen.
12
13
14
15 -->
```

The next best thing is for you to tell me what would logically come next, that is if you are up to it.

I did not include the description of what the above does. It should be abundantly clear.

Until next time**FORTH*** it up!

THE EDITOR

PERSONALS

ADVERTS

WANTED

MEMOTECH - 32 OR 64 K MEMOPACK
MEMOTECH - MEMOCALC
T/S 1000
PHONE ROGER GLOVER 826-2819

COMPUTER SAIL

APPLE COMPATABLE 64K DISC DRIVE
SOFTWARE: PASCAL,FORTH,HOME ACC.
  CHEAP***$500.***
RADIO SHACK MC10 COLOUR COMPUTER
SERVICE MANUALS,USER BOOK
  CHEAP***$50.***
CALL VIC : 824-8734

```
   5 REM HANGMAN
  20 GOSUB 375
  25 LET R=0
  30 PRINT AT 10,0;"TELL EVERYON
E NOT TO LOOK WHILE YOU TYPE IN
THE MYSTERY PHRASE"
  35 INPUT A$
  40 CLS
  45 GOSUB 375
  50 GOSUB 400
  55 LET B=LEN A$
  60 DIM C$(B)
  65 FOR X=1 TO B
  75 LET C$(X)=A$( TO 1)
  80 LET A$=A$(2 TO )
  85 NEXT X
  90 DIM D$(B)
  95 FOR X=1 TO B
 100 LET D$(X)="*"
 105 PRINT AT 0,X;D$(X)
 110 NEXT X
 115 PRINT AT 18,0;"GUESS A LETT
ER"
 120 DIM F$(12)
 125 LET Z=0
 126 LET E$=" "
 127 GOTO 135
 130 INPUT E$
 135 LET A=0
 140 FOR X=1 TO B
 145 IF E$=C$(X) THEN GOTO 165
 150 NEXT X
 155 IF A=1 THEN GOTO 210
 160 GOTO 185
 165 LET D$(X)=E$
 170 LET A=1
 175 NEXT X
 180 IF A=1 THEN GOTO 210
 185 LET Z=Z+1
 190 LET F$(Z)=E$
 195 PRINT AT 20,Z;F$(Z)
 200 GOSUB 235+10*R
 205 LET R=R+1
 210 FOR X=1 TO B
 215 PRINT AT 0,X;D$(X);
 220 NEXT X
 225 IF D$=C$ THEN GOTO 360
 230 GOTO 130
 235 PRINT AT 7,16;"I"
 240 RETURN
 245 PRINT AT 8,15;"▟▙"
 250 RETURN
 255 PRINT AT 9,15;"▜▛"
 260 RETURN
 265 PRINT AT 10,16;"▌"
 270 RETURN
 275 PRINT AT 11,13;"▛▜"
 280 RETURN
 285 PRINT AT 12,13;"▌ ▐"
 290 RETURN
 295 PRINT AT 13,12;"▌▌ ▐ ▌▌"
 300 RETURN
 305 PRINT AT 14,15;"▛ ▜"
 310 RETURN
 315 PRINT AT 15,15;"▌ ▐"
 320 RETURN
 325 PRINT AT 16,14;"▟ ▙"
 330 PRINT
 335 CLS
 340 PRINT AT 5,10;"YOU LOSE"
 345 PRINT AT 8,4;"THE CORRECT P
HRASE IS:"
 350 PRINT AT 11,15-INT B/2;C$
 355 STOP
 360 CLS
 365 PRINT AT 10,12;"YOU WIN"
 370 STOP
 375 PRINT AT 2,7;"▛▜
▜▛"
```

```
380 PRINT AT 3,7;"
    "
385 PRINT AT 4,7;"
    "
390 PRINT AT 3,13;"HANGMAN"
395 RETURN
400 PRINT
405 PRINT
410 PRINT TAB 16;"
415 PRINT TAB 22;"
420 PRINT TAB 22;"
425 PRINT TAB 22;"
430 PRINT TAB 22;"
435 PRINT TAB 22;"
440 PRINT TAB 22;"
445 PRINT TAB 22;"
450 PRINT TAB 22;"
455 PRINT TAB 22;"
460 PRINT TAB 22;"
465 PRINT TAB 22;"
470 PRINT TAB 15;"
475 RETURN
```

```
  1 REM TS 2068 program
  5 REM This program sorts
Lotto 649 numbers according to
their frequency of occurence and
prints out the first 48 numbers
in descending order of occurence
 10 REM If you do not have a
 printer, change the LPRINT in-
 structions in Line 525 to
PRINT instructions
 15 LET a=1
 20 DIM a(49)
 25 GO SUB 400: PRINT INK 6; FL
ASH 1;AT 0,10;"L[redacted]9"
 30 GO SUB 200
 35 PRINT FLASH 0;AT 0,30;a: FO
R x=5 TO 45 STEP 5: INK 2: PLOT
0,14+3*x: DRAW 3,0: NEXT x: INK
7: DIM c(49): FOR y=1 TO 7: PRIN
T AT 20,0;w$; INK 6;AT 20,8;"Ent
er Number ";y: BEEP .1,55
 45 INPUT x
 50 IF x>49 THEN GO TO 45
 55 LET c(x)=x: PRINT AT 21,2+3
*y;x: NEXT y
 60 BEEP .1,20: PRINT AT 20,0;w
$; INK 6;AT 20,0;"Are these numb
ers correct? (y/n)"
 65 INPUT r$
 70 PRINT AT 20,0;w$+w$
 75 GO TO 65+(15 AND r$="y")-(3
0 AND r$="n")
 80 LET a=a+1: FOR x=1 TO 49: L
ET a(x)=a(x)+(1 AND c(x)<>0): NE
XT x
 85 GO SUB 200
 90 BEEP .1,20: PRINT AT 20,0;w
$; INK 6;AT 20,6;"Anymore number
s? (y/n)"
 95 INPUT r$
100 GO TO 95+(15 AND r$="n")-(6
0 AND r$="y")
110 PRINT AT 20,0;w$+w$; FLASH
1; INK 6;AT 21,0;"One moment ple
ase, I'm sorting": GO SUB 500
115 CLS : PRINT AT 21,0;"To sav
e data base, rewind tape,": SAVE
 "Lotto 649" LINE 25
120 CLS : PRINT AT 20,0;"To ver
ify tape, rewind cassette,start
tape & then press any key": PAUS
E 0: VERIFY "": STOP
200 REM Plot
205 INK 7: FOR x=1 TO 49: PLOT
8,14+3*x: DRAW a(x),0: NEXT x: R
ETURN
400 REM Initialize
410 LET w$="
            ": PAPER 1: CLS : I
NK 7: BORDER 1: RETURN
500 REM Sort
505 DIM b(49): FOR j=1 TO 49: L
ET b(j)=a(j): LET c(j)=j: NEXT j
510 FOR j=1 TO 48: FOR k=1 TO 4
9-j
515 IF b(k)<b(k+1) THEN GO SUB
535: LET b(k)=b(k+1): LET b(k+1)
=t: LET c(k)=c(k+1): LET c(k+1)=
s
520 NEXT k: NEXT j
521 REM Print Tickets
525 CLS : FOR x=1 TO 43 STEP 6:
LPRINT "Ticket ";INT (1+x/6);":
";TAB 10;c(x);TAB 14;c(x+1);TAB
18;c(x+2);TAB 22;c(x+3);TAB 26;c
(x+4);TAB 30;c(x+5): NEXT x
530 RETURN
535 LET t=b(k): LET s=c(k): RET
URN
```

```
  1 REM THIS PROGRAM USES A
STRING TO STORE DATA RATHER THAN
AN ARRAY HENCE THE LOAD AND SAVE
TIMES ARE A DIRECT FUNCTION OF
THE AMOUNT OF DATA STORED
  2 REM WHEN ENTERING THE NAME,
ENTER THE SURNAME FIRST. THE
SEARCH FUNCTION ALLOWS USE OF
ALL OR PART OF THE SURNAME
  3 REM ENTERING "" WILL PRINT
THE WHOLE LIST
  4 REM EACH ENTRY IS PRECEDED
BY A BYTE CONTAINING ITS LENGTH.
THE MAXIMUM LENGTH OF EACH
ADDRESS IS THEREFORE 255 BYTES
  5 REM THIS PROGRAM IS FOR THE
ZX81 BUT CAN EASILY MODIFIED FOR
THE 2068
  9 LET W$="
            "
 10 LET A$=" "
 20 CLS
 30 PRINT AT 0,9;"[redacted]"
 35 PRINT ,,,,"[redacted]",,,,"1)N
EW ENTRY",,,,"2)SEARCH",,,,"3)SA
VE"
 40 INPUT X
 50 GO TO 40+((1000*X-40) AND (
X=1 OR X=2 OR X=3))
100 INPUT X$
110 PRINT X$
120 LET Z$=Z$+Y$+X$
130 RETURN
200 PAUSE 4E4
205 POKE                    16437, 255
210 LET Z=CODE INKEY$
220 RETURN
300 CLS
310 FOR I=1 TO LEN Z$
320 IF Z$(I)<>"," THEN NEXT I
330 FOR J=I+1 TO LEN Z$
340 IF Z$(J)="," THEN GO TO 370
350 PRINT Z$(J);
360 NEXT J
370 PRINT (" " AND J-I=1);Z$( T
O I-1);","
380 FOR J=J+1 TO LEN Z$
390 IF Z$(J)="," THEN GO TO 430
400 PRINT Z$(J);
410 IF Z$(J)="," THEN PRINT
420 NEXT J
430 PRINT
440 PRINT ,,Z$(J+1 TO )
450 RETURN
```

```
1000 REM NEW ENTRY
1005 CLS
1010 PRINT AT 0,9;"NEW ENTRY",,,
"NAME? ";
1020 LET Y$=""
1030 LET Z$=""
1040 GO SUB 100
1050 IF X$="" THEN GO TO 20
1080 PRINT ,,"ADDRESS? ";
1090 LET Y$=""
1100 GO SUB 100
1110 PRINT ,,"PHONE NUMBER? ";
1120 LET Y$=""
1130 GO SUB 100
1140 PRINT AT 20,0;"PRESS ENTER
KEY TO SAVE OR ANY  OTHER KEY TO
 ABORT"
1150 GO SUB 200
1160 IF Z<>13 THEN GO TO 20
1170 FOR J=1 TO LEN A$-1
1180 IF A$(J+1 TO J+CODE A$(J))>
=Z$ THEN GO TO 1210
1190 LET J=J+CODE A$(J)
1200 NEXT J
1210 LET A$=A$( TO J-1)+CHR$ LEN
 Z$+Z$+A$(J TO )
1220 GO SUB 300
1230 PRINT AT 21,0;"PRESS ANY KE
Y TO CONTINUE"
1240 GO SUB 200
1250 GO TO 20
2000 REM SEARCH
2005 CLS
2010 PRINT AT 0,12;"SEARCH",,,"E
NTER SURNAME OR PART THEREOF"
2020 INPUT Y$
2030 FOR N=1 TO LEN A$-1
2040 IF LEN Y$<LEN A$-N THEN IF
Y$=A$(N+1 TO N+LEN Y$) THEN GO T
O 2080
2050 LET N=N+CODE A$(N)
2060 IF N<LEN A$ THEN NEXT N
2070 GO TO 20
2080 LET Z$=A$(N+1 TO N+CODE A$(
N))
2090 GO SUB 300
2100 PRINT AT 20,0;"PRESS ""ENTE
R"" TO CONTINUE,  ""D"" TO D
ELETE OR ""P"" TO PRINT"
2110 GO SUB 200
2120 PRINT AT 20,0;W$+W$
2130 IF Z=CODE "P" THEN COPY
2140 IF Z<>CODE "D" THEN GO TO 2
180
2150 LET A$=A$( TO N-1)+A$(N+COD
E A$(N)+1 TO )
2160 LET N=N-1
2170 GO TO 2050
2180 IF Z=13 THEN GO TO 2050
2190 GO TO 20
3000 REM SAVE
3005 CLS
3010 PRINT AT 0,13;"SAVE",,,"EN
TER PROGRAM NAME"
3020 INPUT X$
3030 IF X$="" THEN GO TO 20
3040 PRINT AT 2,0;"PRESS ENTER K
EY TO SAVE"
3050 GO SUB 200
3060 SAVE X$
3070 GO TO 20
```

```
  10 REM **SNIPER AMBUSH**
  20 LET shot=0: LET wait=0: DIM
 P(5,5): DIM L(11,2): DIM S(5,2)
: DIM S$(2,2)
  30 LET TB=5000: LET TM=0: LET
K$="0000000000": LET MN=0: LET A
I=0: LET FR=0: LET MX=80
  40 PAPER 4: INK 7: BORDER 1
  50 GO TO 600
 100 REM **KEYBOARD INPUT**
 120 LET tm=INT ((PEEK 23672+256
*PEEK 23673)/60): PRINT INK 0; P
APER 6;AT 15,28;tm
 121 IF shot=7 THEN LET mn=0: LE
T shot=0: LET wait=RND*5+5
 122 IF wait<>0 THEN GO TO 160
 125 LET st= STICK (1,2): IF st=
0 AND STICK (2,2)=0 THEN GO TO 2
00
 130 IF st=5 OR st=1 OR st=9 THE
N PRINT AT 13,10;R$: LET MN=1:
 140 IF st=6 OR st=2 OR st=10 TH
EN PRINT AT 13,10;0$: LET wait=R
ND*4+4: LET SHOT=0: LET MN=0:
 160 IF st>=4 AND st<=6 THEN LET
 MX=MX-8:
 170 IF st>=8 AND st<=10 THEN LE
T MX=MX+8:
 190 IF ( STICK (2,2)=1 AND MN=1
) THEN LET FR=1: LET shot=shot+1
: GO TO 200
 199 REM *ACTION ROUTINE*
 200 LET wait=wait-1: IF wait<0
THEN LET wait=0
 210 IF MX<0 THEN LET MX=0
 215 IF MX>220 THEN LET MX=220
 220 IF FR=0 THEN GO TO 300
 225 LET FR=0
 230 LET Y=23
 235 IF MX<42 THEN LET Y=Y+32: G
O TO 250
 240 IF MX<70 THEN LET Y=Y+7: GO
 TO 250
 242 IF MX<124 THEN LET Y=Y+8: G
O TO 250
 244 IF MX<164 THEN GO TO 250
 248 LET Y=Y-8
 250 REM *TRACERS AND SOUND*
 255 PLOT OVER 1,82,72
 260 DRAW OVER 1;MX-60,Y
 265 PLOT OVER 1,82,72
 270 DRAW OVER 1;MX-60,Y
 271 SOUND 6,30;7,7;8,16;9,16;10
,16;12,16;13,0: IF RND<.3 THEN P
AUSE 10: GO SUB 9000
 272 REM *CHECK FOR HIT
 275 IF MX>29 AND MX<35 AND K$(1
)>"0" THEN PRINT AT 5,4;"RS"; IN
K 0; PAPER 4;"GH": LET K$(6)="1"
: GO TO 290
 278 IF MX>61 AND MX<67 AND K$(2
)>"0" THEN PRINT AT 8,8;"RS"; IN
K 0; PAPER 4;"GH": LET K$(7)="1"
: GO TO 290
 280 IF MX>101 AND MX<107 AND K$
(3)>"0" THEN PRINT AT 8,13;"RS";
 INK 0; PAPER 4;"GH": LET K$(8)=
"1": GO TO 290
 282 IF MX>144 AND MX<155 AND K$
(4)>"0" THEN PRINT AT 9,19;"RS";
 INK 0; PAPER 4;"GH": LET K$(9)=
"1": GO TO 290
 285 IF MX>185 AND MX<195 AND K$
(5)>"0" THEN PRINT AT 10,24;"RS"
; INK 0; PAPER 4;"GH": LET K$(10
)="1"
 289 REM *CHECK FOR WIN
 290 IF K$(6 TO 10)="11111" THEN
 GO TO 850
```

```
 299 REM *SNIPER ROUTINE
 310 LET K=1+INT (RND*5)
 315 IF K$(K+5)="1" THEN GO TO 1
20
 320 IF K$(K)="4" THEN PRINT INK
 0; PAPER 4;AT S(K,1),S(K,2);S$(
2);
 330 IF K$(K)="5" OR (K$(K)="7"
AND MN=0) THEN GO SUB 400
 340 LET K$(K)=CHR$ (CODE K$(K)+
1)
 350 IF K$(K)>"7" THEN PRINT INK
 0; PAPER 4;AT S(K,1),S(K,2);S$(
1);: LET K$(K)="0"
 360 GO TO 120
 399 REM *SNIPER FIRING
 405 LET N=1+INT (RND*P(K,4))
 410 LET NX=N-P(K,3)
 420 PLOT OVER 1;P(K,1),P(K,2)
 425 DRAW OVER 1;NX,-P(K,5)
 435 PLOT OVER 1;P(K,1),P(K,2)
 440 DRAW OVER 1;NX,-P(K,5)
 444 SOUND 6,RND*10+15;7,7;8,16;
9,16;10,16;12,16;13,0: IF RND<.3
 THEN PAUSE 10: GO SUB 9000
 445 IF MN=0 THEN RETURN
 450 IF P(K,1)+NX>78 AND P(K,1)+
NX<86 THEN PRINT AT 13,10;Q$;AT
15,9;P$;: GO TO 830
 460 RETURN
 598 STOP
 599 REM *INITIALIZATION
 602 CLS : PRINT INK 1; PAPER 7;
"A M B U S H   @1983 MICHAEL BEW
S";AT 4,0;"YOU HAVE BEEN AMBUSHE
D BY GUNMENIN A FOREST. THE ONLY
 SAFE PLACE IS A LOW WALL BEHIND
 WHICH YOU TAKE COVER."
 603 PRINT AT 9,0; INK 1; PAPER
7;"YOU MUST TRY TO KILL ALL GUNM
EN  BY AIMING OVER THE TOP OF TH
E  WALL. BUT THE SNIPERS ARE QUI
TE GOOD SHOTS!";AT 16,0;"HOW LON
G CAN YOU SURVIVE?......"
 606 LET F$=CHR$ 21+CHR$ 1+"
                            "+CHR$
21+CHR$ 0
 610 LET G$=CHR$ 21+CHR$ 1+"
                            "+C
HR$ 21+CHR$ 0
 615 FOR X=0 TO 7: FOR Y=1 TO 9:
 READ A: POKE USR CHR$ (143+Y)+X
,A: NEXT Y: NEXT X
 620 FOR X=0 TO 7: READ A,B: POK
E USR "J"+X,A: POKE USR "K"+X,B:
 NEXT X
 625 FOR X=1 TO 11: READ L(X,1):
 READ L(X,2): NEXT X
 630 FOR X=0 TO 7: READ A: POKE
USR "L"+X,A: NEXT X: LET W$="LLL
LLLLLLLLLLLLLLLLLLLLLLLLLLL"
 640 LET T$="ABC"+F$+"DEF"+F$+"G
HI"
 645 LET S$(1)="GH": LET S$(2)="
JK"
 650 FOR X=0 TO 7: READ A: POKE
USR CHR$ (156)+X,A: NEXT X
 655 FOR X=0 TO 7: READ A,B: POK
E USR "R"+X,A: POKE USR "S"+X,B:
 NEXT X
 660 FOR X=0 TO 7: READ A,B: POK
E USR "T"+X,A: POKE USR "U"+X,B:
 NEXT X
 665 LET Q$=CHR$ 16+CHR$ 0+CHR$
17+CHR$ 4+" "+G$+"L"+G$+"M": LET
 P$="RS"
 670 LET R$=CHR$ 16+CHR$ 0+CHR$
17+CHR$ 4+"T"+G$+"U"+G$+" "
 675 FOR X=1 TO 5: READ S(X,1):
READ S(X,2): NEXT X
 680 FOR X=1 TO 5: FOR Y=1 TO 5:
 READ P(X,Y): NEXT Y: NEXT X
 690 INPUT INK 7; PAPER 2;"PRESS
(ENTER)TO FIND OUT!!!";X$
 700 REM *PRINT SCREEN
 705 CLS : PRINT PAPER 6; INK 1;
"A M B U S H   @1983  MICHAEL BEW
S"
 707 FOR X=10 TO 26 STEP 4: PRIN
T INK 0; PAPER 4;AT 1,X;T$: NEXT
 X
 710 FOR X=1 TO 11: PRINT INK 0;
AT L(X,1),L(X,2);T$;: NEXT X
 715 FOR X=3 TO 11: PRINT AT L(X
,1)+2,L(X,2)+2; INK 6;"I";: NEXT
 X
 720 PRINT INK 0;AT 15,0;T$;AT 1
7,3;T$
 730 PRINT INK 0;AT 14,0;W$
 800 PRINT AT 13,10;Q$
 805 PRINT AT 15,23; INK 0; PAPE
R 6;"TIME:"
 810 PRINT AT 20,0; PAPER 2; INK
 7;"SHOOT SNIPERS AS THEY FIRE.
USE  RIGHT JOYSTICK TO AIM & FIR
E    "
 820 POKE 23672,0: POKE 23673,0:
 GO TO 100
 829 REM *PLAYER SHOT!
 830 PRINT AT 20,0; PAPER 7; INK
 2;"

    ";AT 20,0; FLASH 1;"YOU HAVE
 BEEN SHOT! IN TIME:";tm,AT 21,0
;"THIS IS THE SNIPER WHO SHOT YO
U↑"
 832 PRINT INK 0; PAPER 4; FLASH
 1;AT S(K,1),S(K,2);S$(2);
 835 BEEP .4,1: PAUSE 4: BEEP .2
5,1: PAUSE 2: BEEP .15,1: BEEP .
4,1: BEEP .25,4: PAUSE 2: BEEP .
2,3 : PAUSE 2: BEEP .2,3: PAUSE
2: BEEP .25,1: PAUSE 1: BEEP .4,
1: PAUSE 2: BEEP .25,0: BEEP 1,1
 840 GO TO 860
 849 REM *ALL SNIPERS DEAD
 850 IF TB>TM THEN LET TB=TM
 855 PRINT AT 20,0; PAPER 7; INK
 2;"

    ";AT 20,0; FLASH 1;"YOU SHOT
 THEM ALL IN TIME:";TM,AT 21,0;"
        BEST TIME SO FAR:";TB,
 857 FOR Y=1 TO 5: FOR X=1 TO 10
: BEEP .05,X*2: NEXT X: NEXT Y
 860 INPUT INK 0; PAPER 7; FLASH
 1;"PRESS <ENTER> FOR NEXT GAME"
;X$
 870 LET MX=80: LET K$="00000000
00"
 880: LET MN=0: LET FR=0
 890 GO TO 700
 998 STOP
 999 REM **TREE
1000 DATA 3,15,0,127,255,252,0,6
0,8,3,255,192,63,255,188,0,60,0,
15,255,240,55,247,248,0,60,138,1
5,255,248,31,63,248,0,60,40,126,
255,126,31,60,240,0,60,138,127,2
55,254,24,60,48,0,60,162,255,255
,252,0,60,0,0,60,160,127,223,252
,0,60,0,0,60,32
```

```
1009 REM *SNIPER
1010 DATA 0,252,63,252,2,124,3,2
52,0,124,1,252,1,124,3,60
1019 REM **TREE PRINT AT FILE
1020 DATA 2,4,1,18,3,6,2,20,3,24
,4,11,4,29,6,10,6,15,7,21,8,26
1029 REM *WALL
1030 DATA 51,255,219,255,253,255
,183,255
1039 REM *MAN CROUCHING
1040 DATA 249,113,113,33,255,113
,123,219
1049 REM *MAN DOWN
1050 DATA 0,0,0,0,0,0,0,0,160,0,
247,224,255,241,247,255
1059 REM *MAN STANDING
1060 DATA 248,115,113,255,115,25
1,118,255,38,253,250,251,254,247
,112,255
1069 REM *SNIPER PRINT AT FILE
1070 DATA 5,6,8,10,8,15,9,21,10,
26
1079 REM *SNIPER FIRING COORDS
1080 DATA 47,127,10,50,54,79,110
,39,70,37,119,110,60,60,37,167,1
02,127,80,29,207,94,200,120,21
4000 BORDER 7: PAPER 7: INK 0: C
LS
9000 SOUND 7,62;8,16;12,20;13,0:
 FOR r=50 TO 100 STEP 2: SOUND 0
,r: NEXT r: RETURN
```

```
   1 REM ZX81/TS1000 PROGRAM
  10 REM STOCK BROKER
  20 GOSUB 9000
  50 LET R$="STOCK BROKER"
  55 GOSUB 8000
  60 PRINT AT 5,2;"SELECT:";AT 7
,2;"1)ADD A NEW STOCK?";AT 9,2;"
2)CHANGE A STOCK ON FILE?";AT 11
,2;"3)SAVE STOCK DATA?"
  65 INPUT R
  70 GOTO 65+(10 AND R=F)+(1000
AND R=2)+(2000 AND R=3)
  75 REM ADD A NEW STOCK
  90 LET R$="ADD A NEW STOCK"
  92 GOSUB 8000
  94 GOSUB 8300
  95 LET R$="STOCK NUMBER"
  96 GOSUB 8060
  97 INPUT R
 100 LET R$="NAME OF STOCK"
 105 GOSUB 8060
 106 INPUT R$
 107 LET Y(R)=(LEN R$ AND LEN R$
<=18)+(18 AND LEN R$>18)
 110 LET A$(R, TO 18)=R$
 112 PRINT AT 7+2*R,3;A$(R, TO 1
8)
 115 GOSUB 8680
 120 INPUT A$(R,20 TO 23)
 125 PRINT AT 7+2*R,22;A$(R,20 T
O 23)
 127 GOSUB 8695
 129 INPUT A$(R,25 TO 28)
 130 PRINT AT 7+2*R,27;A$(R,25 T
O 28)
 132 GOSUB 8360
 133 GOTO (50 AND R$="N")+(75 AN
D R$="Y")
 135 GOTO 50
1065 REM CHANGE AN EXISTING STOCK
```

```
1070 LET R$="CHANGE AN EXISTING
STOCK"
1072 GOSUB 8000
1073 GOSUB 8300
1074 LET R$="STOCK NUMBER"
1075 GOSUB 8060
1077 INPUT U
1078 LET R$=A$(U, TO Y(U))
1079 GOSUB 8000
1080 PRINT AT 5,3;"SELECT:";AT 7
,3;"1) MAKE AN ENTRY?";AT 9,3;"2
) CHANGE/DELETE AN ENTRY?";AT 11
,3;"3) RETURN TO MAIN MENU?"
1085 INPUT R
1086 CLS
1090 GOTO 1065+(10 AND R=1)+(185
 AND R=2)-(1035 AND R=3)
1095 REM MAKE AN ENTRY
1100 LET Z$=""
1110 GOTO (1125 AND U=1)+(1430 A
ND U=2)+(1575 AND U=3)+(1720 AND
 U=4)+(1865 AND U=5)
1125 REM MAKE ENTRY 1
1127 GOSUB 8800
1130 IF N=M THEN GOTO 1165
1135 FOR X=F TO W1
1140 PRINT AT 19,0;X
1145 FOR Y=4 TO 4+52*A(X)/VAL A$
(1,25 TO 28)
1150 PLOT Y,4
1155 NEXT Y
1156 LET R$=STR$ N(X)
1157 GOSUB 8715
1160 PRINT AT 19,Y/2;A(X);AT 19,
N(X)*G/VAL A$(1,20 TO 23);B$
1165 SCROLL
1170 GOSUB 8800
1175 PRINT AT 21,31;
1180 NEXT X
1185 LET N=N+F
1186 LET W1=(N AND N<=G)+(G AND
N>G)
1187 GOSUB 8765
1189 INPUT N(W1)
1190 GOSUB 8695
1200 IF N>G THEN GOSUB 8855
1205 INPUT A(W1)
1210 PRINT AT 21,0;W$
1215 PRINT AT 19,0;N
1220 FOR Y=4 TO 4+52*A(W1)/VAL A
$(1,25 TO 28)
1225 PLOT Y,4
1230 NEXT Y
1231 LET R$=STR$ N(W1)
1232 GOSUB 8715
1235 PRINT AT 19,Y/2;A(W1);AT 19
,N(W1)*G/VAL A$(1,20 TO 23);B$
1240 SCROLL
1245 PRINT AT 21,31;
1250 IF N>F THEN GOSUB 8100
1255 GOSUB 8800
1260 GOSUB 8360
1265 GOTO (1185 AND R$="Y")+(50
AND R$="N")
1270 REM CHANGE AN ENTRY
1272 LET R$=A$(U, TO Y(U))
1274 GOSUB 8000
1275 GOTO (1300 AND U=1)+(2100 A
ND U=2)+(2200 AND U=3)+(2295 AND
 U=4)+(2390 AND U=5)
1300 REM CHANGE STOCK 1
1304 GOSUB 8500
1315 INPUT R
1320 GOTO 1315+(10 AND R=F)+(20
AND R=2)+(30 AND R=3)+(40 AND R=
4)
1325 GOSUB 8520
1330 GOTO 50
1335 GOSUB 8000
1336 GOSUB 8680
1337 INPUT A$(F,20 TO 23)
1338 GOTO 1076
```

```
1345 GOSUB 8000
1346 GOSUB 8695
1347 INPUT A$(F,25 TO 28)
1350 GOTO 1078
1355 GOSUB 8000
1370 PRINT AT 4,0;"[illegible]
 [illegible]"
1375 FOR X=F TO W1 STEP 2
1380 PRINT X;TAB 5;A(X);TAB 10;N
(X);TAB 15;X+F;TAB 20;A(X+F);TAB
 25;N(X+F)
1385 NEXT X
1390 GOSUB 8750
1395 INPUT N(R)
1400 GOSUB 8780
1405 INPUT A(R)
1420 GOTO 1078
1430 REM [illegible]
1435 GOSUB 8815
1440 IF P=M THEN GOTO 1495
1445 FOR X=F TO W2
1450 PRINT AT 19,0;X
1455 FOR Y=4 TO 4+52*B(X)/VAL A$
(2,25 TO 28)
1460 PLOT Y,4
1465 NEXT Y
1466 LET R$=STR$ P(X)
1467 GOSUB 8715
1470 PRINT AT 19,Y/2;B(X);AT 19,
P(X)*G/VAL A$(2,20 TO 23);B$
1475 SCROLL
1480 GOSUB 8815
1485 PRINT AT 21,31;
1490 NEXT X
1495 LET P=P+F
1496 LET W2=(P AND P<=G)+(G AND
P>G)
1500 GOSUB 8765
1501 INPUT P(W2)
1502 GOSUB 8695
1505 IF P>G THEN GOSUB 8875
1510 INPUT B(W2)
1515 PRINT AT 21,0;W$
1520 PRINT AT 19,0;P
1525 FOR Y=4 TO 4+52*B(W2)/VAL A
$(2,25 TO 28)
1530 PLOT Y,4
1535 NEXT Y
1536 LET R$=STR$ P(W2)
1537 GOSUB 8715
1540 PRINT AT 19,Y/2;B(W2);AT 19
,P(W2)*G/VAL A$(2,20 TO 23);B$
1545 SCROLL
1550 PRINT AT 21,31;
1555 IF P>F THEN GOSUB 2500
1560 GOSUB 8815
1565 GOSUB 8360
1570 GOTO (1495 AND R$="Y")+(50
AND R$="N")
1575 REM [illegible]
1580 GOSUB 8825
1585 IF Q=M THEN GOTO 1640
1590 FOR X=F TO W3
1595 PRINT AT 19,0;X
1600 FOR Y=4 TO 4+52*C(X)/VAL A$
(3,25 TO 28)
1605 PLOT Y,4
1610 NEXT Y
1611 LET R$=STR$ Q(X)
1612 GOSUB 8715
1615 PRINT AT 19,Y/2;C(X);AT 19,
Q(X)*G/VAL A$(3,20 TO 23);B$
1620 SCROLL
1625 GOSUB 8825
1630 PRINT AT 21,31;
1635 NEXT X
1640 LET Q=Q+F
1641 LET W3=(Q AND Q<=G)+(G AND
Q>G)
1645 GOSUB 8765
1646 INPUT Q(W3)
1647 GOSUB 8695
1650 IF Q>G THEN GOSUB 8895
1655 INPUT C(W3)
1660 PRINT AT 21,0;W$
1665 PRINT AT 19,0;Q
1670 FOR Y=4 TO 4+52*C(W3)/VAL A
$(3,25 TO 28)
1675 PLOT Y,4
1680 NEXT Y
1681 LET R$=STR$ Q(W3)
1682 GOSUB 8715
1685 PRINT AT 19,Y/2;C(W3);AT 19
,Q(W3)*G/VAL A$(3,20 TO 23);B$
1690 SCROLL
1695 PRINT AT 21,31;
1700 IF Q>F THEN GOSUB 2550
1705 GOSUB 8825
1710 GOSUB 8360
1715 GOTO (1640 AND R$="Y")+(50
AND R$="N")
1720 REM [illegible]
1725 GOSUB 8835
1730 IF S=M THEN GOTO 1785
1735 FOR X=F TO W4
1740 PRINT AT 19,0;X
1745 FOR Y=4 TO 4+52*D(X)/VAL A$
(4,25 TO 28)
1750 PLOT Y,4
1755 NEXT Y
1756 LET R$=STR$ S(X)
1757 GOSUB 8715
1760 PRINT AT 19,Y/2;D(X);AT 19,
S(X)*G/VAL A$(4,20 TO 23);B$
1765 SCROLL
1770 GOSUB 8835
1775 PRINT AT 21,31;
1780 NEXT X
1785 LET S=S+F
1785 LET W4=(S AND S<=G)+(G AND
S>G)
1790 GOSUB 8765
1792 INPUT S(W4)
1793 GOSUB 8695
1795 IF S>G THEN GOSUB 8915
1800 INPUT D(W4)
1805 PRINT AT 21,0;W$
1810 PRINT AT 19,0;S
1815 FOR Y=4 TO 4+52*D(W4)/VAL A
$(4,25 TO 28)
1820 PLOT Y,4
1825 NEXT Y
1826 LET R$=STR$ S(W4)
1827 GOSUB 8715
1830 PRINT AT 19,Y/2;D(W4);AT 19
,S(W4)*G/VAL A$(4,20 TO 23);B$
1835 SCROLL
1840 PRINT AT 21,31;
1845 IF S>F THEN GOSUB 2600
1850 GOSUB 8835
1855 GOSUB 8360
1860 GOTO (1785 AND R$="Y")+(50
AND R$="N")
1865 REM [illegible]
1870 GOSUB 8845
1875 IF T=M THEN GOTO 1930
1880 FOR X=F TO W5
1885 PRINT AT 19,0;X
1890 FOR Y=4 TO 4+52*E(X)/VAL A$
(5,25 TO 28)
1895 PLOT Y,4
1900 NEXT Y
1901 LET R$=STR$ T(X)
1902 GOSUB 8715
1905 PRINT AT 19,Y/2;E(X);AT 19,
T(X)*G/VAL A$(5,20 TO 23);B$
1910 SCROLL
1915 GOSUB 8845
```

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1920 PRINT AT 21,31;
1925 NEXT X
1930 LET T=T+F
1931 LET W5=(T AND T<=G)+(G AND
T>G)
1935 GOSUB 8765
1936 INPUT T(W5)
1937 GOSUB 8695
1940 IF T>G THEN GOSUB 8935
1945 INPUT E(W5)
1950 PRINT AT 21,0;W$
1955 PRINT AT 19,0;T
1960 FOR Y=4 TO 4+52*E(W5)/VAL A
$(5,25 TO 28)
1965 PLOT Y,4
1970 NEXT Y
1971 LET R$=STR$ T(W5)
1972 GOSUB 8715
1975 PRINT AT 19,Y/2;E(W5);AT 19
,T(W5)*G/VAL A$(5,20 TO 23);B$
1980 SCROLL
1985 PRINT AT 21,31;
1990 IF T>F THEN GOSUB 2650
1995 GOSUB 8845
2000 GOSUB 8360
2005 GOTO (1930 AND R$="Y")+(50
AND R$="N")
2065 REM [illegible]
2070 LET R$="SAVE STOCK DATA"
2075 GOSUB 8000
2080 PRINT AT 10,0;"REWIND TAPE,
 START RECORDING,   WAIT 10 SECO
NDS AND THEN PRESS   ""ENTER"" KE
Y"
2085 INPUT R$
2090 SAVE "STOC[illegible]"
2095 GOTO 50
2100 REM [illegible]
2115 GOSUB 8500
2120 INPUT R
2125 GOTO 2120+(10 AND R=1)+(20
AND R=2)+(30 AND R=3)+(40 AND R=
4)
2130 GOSUB 8560
2135 GOTO 50
2140 GOSUB 8000
2141 GOSUB 8680
2142 INPUT A$(2,20 TO 23)
2143 GOTO 1078
2150 GOSUB 8000
2151 GOSUB 8695
2152 INPUT A$(2,25 TO 26)
2155 GOTO 1078
2160 GOSUB 8000
2165 PRINT AT 4,0;"[illegible]
 [illegible]"
2170 FOR X=F TO W2 STEP 2
2175 PRINT X;TAB 5;B(X);TAB 10;P
(X);TAB 15;X+F;TAB 20;B(X+F);TAB
 25;P(X+F)
2180 NEXT X
2185 GOSUB 8750
2190 INPUT P(R)
2195 GOSUB 8780
2196 INPUT B(R)
2197 GOTO 1078
2200 REM [illegible]
2210 GOSUB 8500
2215 INPUT R
2220 GOTO 2215+(10 AND R=1)+(20
AND R=2)+(30 AND R=3)+(40 AND R=
4)
2225 GOSUB 8590
2230 GOTO 50
2235 GOSUB 8000
2236 GOSUB 8680
2237 INPUT A$(3,20 TO 23)
2238 GOTO 1078
2245 GOSUB 8000
2246 GOSUB 8695
2247 INPUT A$(3,25 TO 26)
2250 GOTO 1078
2255 GOSUB 8000
2260 PRINT AT 4,0;"[illegible]
 [illegible]"
2265 FOR X=F TO W3 STEP 2
2270 PRINT X;TAB 5;C(X);TAB 10;Q
(X);TAB 15;X+F;TAB 20;C(X+F);TAB
 25;Q(X+F)
2275 NEXT X
2280 GOSUB 8750
2285 INPUT Q(R)
2286 GOSUB 8780
2287 INPUT C(R)
2290 GOTO 1078
2295 REM [illegible]
2305 GOSUB 8500
2310 INPUT R
2315 GOTO 2310+(10 AND R=1)+(20
AND R=2)+(30 AND R=3)+(40 AND R=
4)
2320 GOSUB 8590
2325 GOTO 50
2330 GOSUB 8000
2335 GOSUB 8680
2336 INPUT A$(4,20 TO 23)
2337 GOTO 1078
2345 GOSUB 8000
2346 GOSUB 8695
2347 INPUT A$(4,25 TO 26)
2348 GOTO 1078
2350 GOSUB 8000
2355 PRINT AT 4,0;"[illegible]
 [illegible]"
2360 FOR X=F TO W4 STEP 2
2365 PRINT X;TAB 5;D(X);TAB 10;S
(X);TAB 15;X+F;TAB 20;D(X+F);TAB
 25;S(X+F)
2370 NEXT X
2375 GOSUB 8750
2380 INPUT S(R)
2381 GOSUB 8780
2382 INPUT D(R)
2385 GOTO 1078
2390 REM [illegible]
2400 GOSUB 8500
2405 INPUT R
2410 GOTO 2405+(10 AND R=1)+(20
AND R=2)+(30 AND R=3)+(40 AND R=
4)
2415 GOSUB 8650
2420 GOTO 50
2425 GOSUB 8000
2426 GOSUB 8680
2427 INPUT A$(5,20 TO 23)
2428 GOTO 1078
2435 GOSUB 8000
2436 GOSUB 8695
2437 INPUT A$(5,25 TO 28)
2440 GOTO 1078
2445 GOSUB 8000
2450 PRINT AT 4,0;"[illegible]
 [illegible]"
2455 FOR X=F TO W5 STEP 2
2460 PRINT X;TAB 5;E(X);TAB 10;T
(X);TAB 15;X+F;TAB 20;E(X+F);TAB
 25;T(X+F)
2465 NEXT X
2470 GOSUB 8750
2475 INPUT T(R)
2476 GOSUB 8780
2477 INPUT E(R)
2480 GOTO 1078
2500 REM [illegible]
2505 LET A=M
2510 LET B=M
2515 FOR Z=F TO W2
2520 LET A=A+P(Z)
2525 LET B=B+Z*P(Z)
2530 NEXT Z
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2535 LET C=P*(P+F)/2
2540 LET M1=(B-C*A/P)/((P*(P+F)*
(2*P+F)/6)-C**2/P)
2545 GOTO 8185
2550 REM [illegible]
2555 LET A=M
2560 LET B=M
2565 FOR Z=F TO W3
2570 LET A=A+Q(Z)
2575 LET B=B+Z*Q(Z)
2580 NEXT Z
2585 LET C=Q*(Q+F)/2
2590 LET M1=(B-C*A/Q)/((Q*(Q+F)*
(2*Q+F)/6)-C**2/Q)
2595 GOTO 8185
2600 REM [illegible]
2605 LET A=M
2610 LET B=M
2615 FOR Z=F TO W4
2620 LET A=A+S(Z)
2625 LET B=B+Z*S(Z)
2630 NEXT Z
2635 LET C=S*(S+F)/2
2640 LET M1=(B-C*A/S)/((S*(S+F)*
(2*S+F)/6)-C**2/S)
2645 GOTO 8185
2650 REM [illegible]
2655 LET A=M
2660 LET B=M
2665 FOR Z=F TO W5
2670 LET A=A+T(Z)
2675 LET B=B+Z*T(Z)
2680 NEXT Z
2685 LET C=T*(T+F)/2
2690 LET M1=(B-C*A/T)/((T*(T+F)*
(2*T+F)/6)-C**2/T)
2695 GOTO 8185
8000 CLS
8010 PRINT AT 0,0;"[illegible]"
8020 PRINT AT F,0;"[illegible]"
8030 PRINT AT 2,0;"[illegible]"
8040 PRINT AT F,15-.5*LEN R$;R$
8050 RETURN
8060 PRINT AT 21,0;W$
8070 LET R$="ENTER "+R$
8080 PRINT AT 21,15-.5*LEN R$;R$
8090 RETURN
8100 REM [illegible]
8110 LET A=M
8120 LET B=M
8130 FOR Z=F TO ((N AND N<=G)+(G
 AND N>G))
8140 LET A=A+N(Z)
8150 LET B=B+Z*N(Z)
8160 NEXT Z
8170 LET C=N*(N+F)/2
8180 LET M1=(B-C*A/N)/((N*(N+F)*
(2*N+F)/6)-C**2/N)
8185 LET Z$=("[illegible]" AND M1>=0)+("[illegible]"
 AND M1<0)
8190 RETURN
8200 CLS
8210 PRINT AT 10,2;"SORRY, THE C
OMPUTER IS FULL"
8220 GOSUB 8240
8230 GOTO 50
8240 PRINT AT 21,0;"PRESS ""ENTE
R"" KEY TO CONTINUE"
8250 INPUT R$
8260 RETURN
8300 PRINT AT 5,0;"  [illegible]";TAB
22;"[illegible]";AT 9,0;"1)
 ";A$(1);AT 11,0;"2) ";A$(2);AT
13,0;"3) ";A$(3);AT 15,0;"4) ";A
$(4);AT 17,0;"5) ";A$(5)
8310 RETURN
8360 PRINT AT 21,0;W$
8365 PRINT AT 21,5;"ANYMORE ENTR
IES (Y/N)?"
8370 INPUT R$
8380 RETURN
8500 PRINT AT 5,3;"SELECT:";AT 7
,3;"1) DELETE STOCK?";AT 9,3;"2)
 CHANGE MAX BID?";AT 11,3;"3) CH
ANGE MAX VOL?";AT 13,3;"4) CHANG
E BID/VOL?"
8510 RETURN
8520 LET N=F
8525 LET Y(F)=M
8530 FOR X=F TO G
8535 LET A(X)=M
8540 NEXT X
8542 LET A$(F)=""
8555 RETURN
8560 LET P=F
8565 LET Y(2)=M
8570 FOR X=F TO G
8575 LET B(X)=M
8580 NEXT X
8582 LET A$(2)=""
8585 RETURN
8590 LET Q=F
8595 LET Y(3)=M
8600 FOR X=F TO G
8605 LET C(X)=M
8610 NEXT X
8612 LET A$(3)=""
8615 RETURN
8620 LET S=F
8625 LET Y(4)=M
8630 FOR X=F TO G
8635 LET D(X)=M
8640 NEXT X
8642 LET A$(4)=""
8645 RETURN
8650 LET T=F
8652 LET Y(5)=M
8655 FOR X=F TO G
8660 LET E(X)=M
8665 NEXT X
8667 LET A$(5)=""
8670 RETURN
8675 GOSUB 8000
8680 LET R$="MAXIMUM PRICE OF ST
OCK"
8685 GOSUB 8060
8690 RETURN
8695 LET R$="MAX VOLUME TRADED (
HDS)"
8700 GOSUB 8060
8705 RETURN
8715 DIM B$(LEN R$)
8720 FOR Z=F TO LEN R$
8725 LET B$(Z)=CHR$ (128+CODE R$
(Z))
8730 NEXT Z
8735 RETURN
8750 LET R$="DAY TO BE CHANGED"
8755 GOSUB 8060
8760 INPUT R
8765 LET R$="CLOSING BID"
8770 GOSUB 8060
8775 RETURN
8780 LET R$="VOLUME (HDS)"
8785 GOSUB 8060
8790 RETURN
8800 PRINT AT 0,15-.5*LEN A$(1,
TO Y(1));A$(1, TO Y(1));AT 0,31;
Z$
8805 PRINT AT F,M;W$
8810 RETURN
8815 PRINT AT M,15-.5*LEN A$(2,
TO Y(2));A$(2, TO Y(2));AT M,31;
Z$
8820 GOTO 8805
8825 PRINT AT M,15-.5*LEN A$(3,
TO Y(3));A$(3, TO Y(3));AT M,31;
Z$
8830 GOTO 8805
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8835 PRINT AT M,15-.5*LEN A$(4,
TO Y(4));A$(4, TO Y(4));AT M,31;
Z$
8840 GOTO 8805
8845 PRINT AT M,15-.5*LEN A$(5,
TO Y(5));A$(5, TO Y(5));AT M,31;
Z$
8850 GOTO 8805
8855 FOR X=F TO 29
8860 LET A(X)=A(X+F)
8865 NEXT X
8870 RETURN
8875 FOR X=F TO 29
8880 LET B(X)=B(X+F)
8885 NEXT X
8890 RETURN
8895 FOR X=F TO 29
8900 LET C(X)=C(X+F)
8905 NEXT X
8910 RETURN
8915 FOR X=F TO 29
8920 LET D(X)=D(X+F)
8925 NEXT X
8930 RETURN
8935 FOR X=F TO 29
8940 LET E(X)=E(X+F)
8945 NEXT X
8950 RETURN
9000 LET W$="
                    "
9005 LET M=0
9010 LET P=M
9015 LET Q=M
9020 LET S=M
9025 LET N=M
9030 LET T=M
9032 LET G=30
9035 DIM A(G)
9040 DIM B(G)
9045 DIM C(G)
9050 DIM D(G)
9055 DIM E(G)
9060 DIM A$(5,29)
9065 LET D=M
9070 DIM Y(5)
9075 DIM N(G)
9080 DIM P(G)
9085 DIM Q(G)
9090 DIM S(G)
9095 DIM T(G)
9100 LET F=1
9115 RETURN
```